

REMARKS

Status of the claims

Claims 1-4, 6-9 and 11-16 are pending in the application. New claims 15 and 16 have been added. Support for new claims 15 and 16 may be found respectively in the specification at paragraphs [0016] and [0014].

Statement of the substance of the interview

Applicant would like to thank the Examiner for his time and careful consideration of the invention and prior art during the interview of January 19, 2010. During the interview, Applicant's representative explained that the fundamental nature of the invention is to address the problem of the break down of an emulsion explosive, as reflected in changes in viscosity and droplet size, that occur as the emulsion explosive travels through a conduit, by incorporating a means for dissipating potential energy. The fundamental nature of GB '202, on the other hand, was to minimize the time spent in a pipeline, i.e. the opposite of the invention. In addition, GB '202 discloses an apparatus wherein slurry and crosslinking agent are separately added to two different pipelines and then mixed together at a turbine. Thus, the composition which exits the turbine, which will contain crosslinked slurry, slurry and crosslinking agent will be fundamentally changed in its physical properties, including the viscosity and droplet size.

Applicant's representative further noted that the pipeline in GB '202 is on the order of 5cm in diameter (column 2, lines 85-87), with part of the interior capacity being "lost" to the interior pipeline having a diameter of 0.5 cm (column 3, line 15), whereas the conduits of the instant invention may be much larger, on the order of 100-300 mm (10-30 cm), i.e. considerably larger than the pipelines of GB '202. The difference in the diameters of the present invention versus those of GB '202 will change the problems associated with transporting materials through the pipes. In this regard, as noted during the interview, the issue addressed in GB '202 is that the slurry remains in the pipe too long, causing problems and thus the goal was to minimize the time in the pipeline. With the present invention on the other hand, the speed with which the emulsion explosive travels through the conduit results in shear forces that cause problems to the emulsion

and the potential energy of the emulsion explosive must be dissipated. These features are discussed in further detail below.

Rejections under 35 U.S.C.§103

Claims 1-4, 6, 7, 9 and 11-14 remain rejected under 35 U.S.C.§103, as allegedly being obvious over GB ‘202. As before, the Examiner relies on GB ‘202 as teaching a method of transporting explosive slurries down boreholes, wherein the end of the conduit tube is fitted with a turbine connected to a stirrer, which is turned on by the flow of slurry. GB ‘202 is asserted to differ from the instant invention in failing to explicitly teach that there is no change in the viscosity of the solution. The Examiner asserts that one skilled in the art would not expect that the viscosity would change, absent evidence demonstrating otherwise. In addition, the Examiner asserts that one skilled in the art would appreciate that changes in the viscosity would effect the performance and therefore elimination or minimization of viscosity changes would be desirable.

In response to the arguments of August 7, 2009, the Examiner asserts that Figure 3 shows that the turbine is part of the conduit, but the stirrer is attached to the end of the conduit. As a result the slurry entering the “conduit” would be essentially the same as the slurry exiting the “conduit”, which then goes into the stirrer to be mixed with the crosslinking agent. The Examiner further notes that the claims do not preclude additional components at the end of the conduit for further modifying the composition.

Applicants traverse this amendment and withdrawal thereof is respectfully requested.

Summary of the invention

The present invention is directed to a method of transporting an emulsion explosive down a vertical conduit having an inlet provided at the top of the conduit and an outlet provided at the bottom of the conduit, by feeding the emulsion explosive into the inlet of the conduit and contacting the emulsion explosive with means for dissipating potential energy released by the emulsion explosive as it is transported down the conduit so that turbulence in the emulsion explosive at the outlet of the conduit is reduced in order to reduce or avoid breakdown of the

emulsion explosive and/or changes in viscosity and/or changes in droplet size of the emulsion explosive.

As discussed in the interview, the purpose of the invention is to provide a method of transporting an emulsion explosive in such a way that the emulsion explosive composition is not physically modified by the shear forces as travels through the conduit. This problem is discussed in paragraphs [0002] and [0003] of the specification, which state,

When a pipe is arranged vertically and filled with a liquid, gravity causes the liquid to exert a hydraulic pressure at the bottom of the pipe. This hydraulic pressure causes liquid to flow out of the bottom of the pipe. If the pipe is long, the hydraulic pressure can be high and this can lead to significant velocity and consequently turbulence in the liquid as it exits the pipe. This turbulence results in shearing of the liquid and this can be problematic if it alters the characteristics of the liquid. Heat can also be generated in the liquid.

One area where this problem is encountered is in underground mining where it is desired to transport an emulsion explosive from a surface to an underground storage facility. Shearing of the emulsion explosive can lead to changes in emulsion droplet size and, possibly, emulsion breakdown. This may render the emulsion less effective or of no use at all. Shearing of the emulsion also tends to cause a viscosity increase which can make subsequent use difficult.

The present invention addresses this problem with the feature of “means for dissipating potential energy released by the emulsion explosive as it is transported down the conduit” so that turbulence in the emulsion explosive at the outlet of the conduit is reduced in order to reduce or avoid breakdown of the emulsion explosive and/or changes in viscosity and/or changes in droplet size of the emulsion explosive. Thus, claim 1, as pending reflects the fundamental feature of the invention that the potential energy in the traveling emulsion explosive is dissipated so that the emulsion is not physically changed, i.e. there are no, or minimal, changes in viscosity and droplet size and the basic characteristics of the emulsion explosive are not changed from when the emulsion is put in the top of the conduit to when it emerges at the other end.

Summary of GB ‘202 and differences from the instant invention

The premise of GB ‘202 is the exact opposite of that of the instant invention, as evidenced by the disclosure at column 1, lines 14-27, which state,

As the pipelines may be 100 m. or more in length, and as the slurries often include cross-linking agents to cause them to gel in order to minimise the effect of water in the borehole, the slurries frequently begin to gel before leaving the pipeline so that a great deal of power is expended in pumping the slurries into the borehole.

It is the principal object of the present invention to provide apparatus for combination with a pipeline for conveying explosive slurries to boreholes whereby the residence time of cross-linked slurries in the pipeline is minimised.

Thus, the principle object GB '202 is to minimize the time that a slurry spends inside a pipe, which is opposite to the present invention, since minimizing the time the slurry spends inside the pipe would tend to increase the potential energy and shear forces. In addition, in opposite to the instant invention the basic characteristics, including the viscosity and droplet size, of the slurry of GB '202 would be modified from the beginning to the end of the pipe.

The invention of GB '202 is best illustrated in Figure 2 of the reference, which discloses that with GB '202 the pipeline has an outer pipeline (4), which conveys slurry without any crosslinking agent. Within the outer pipeline (4) is an inner conduit (14), which functions to transport the crosslinking agent. The slurry and crosslinking agent then exit at outlet (15), at which point the two components are mixed together prior to encountering the turbine (6). Thus, the composition that exits from the turbine is a mixed composition of the crosslinking agent, slurry and crosslinked slurry. Since the crosslinking agent is added to the slurry prior to encountering the turbine and the slurry is then crosslinked, the basic characteristics of the composition that was put in the top of the pipe will necessarily be different from that which exits from the turbine, including the viscosity and droplet size. As, noted this is fundamentally different from and in opposite to the required feature of the present invention that changes in the viscosity and droplet sized are reduced or eliminated/avoided.

New claim 16 further emphasizes this feature with the recitation that the "the viscosity of the emulsion explosive at the outlet of the conduit is no more than about 5,000 cPa at 25° greater than the viscosity of the emulsion explosive that is fed into the inlet." There is no disclosure or suggestion in GB '202 of maintaining the viscosity of the slurry, such that the viscosity of the composition at the outlet of the pipeline is no more than about 5,000 cPa at 25° greater than the viscosity of the material that is fed into the pipeline. In fact, since GB '202 wants to minimize

the time in the pipeline, the feature of maintaining the viscosity would be in opposite of the goal of GB ‘202, since shear forces, which would increase as the time in the pipeline is minimized, are known to breakdown the composition and thus reduce the viscosity.

New claim 15 further defines the invention as having a pipe diameter of 100-300 mm. The pipeline in GB ‘202 is on the order of 5cm in diameter (column 2, lines 85-87) or even smaller (column 1, lines 11-14, which disclose a pipe diameter of 2-3 cm), with part of the interior capacity being “lost” to the interior pipeline having a diameter of 0.5 cm (column 3, line 15). The conduits of the instant invention, on the other hand, may be much larger, on the order of 100-300 mm (10-30 cm), i.e. considerably larger than the pipelines of GB ‘202. The difference in the diameters of the present invention versus those of GB ‘202 will change the problems associated with transporting materials through the pipes. In this regard, as noted during the interview, the issue addressed in GB ‘202 is that the slurry remains in the pipe too long, causing problems and thus the goal was to minimize the time in the pipeline. With the present invention on the other hand, the speed with which the emulsion explosive travels through the conduit results in shear forces that cause problems to the emulsion and the potential energy of the emulsion explosive must be dissipated. There is no disclosure or suggestion in GB ‘202 of a conduit having a larger size, nor would one skilled in the art be motivated to change the diameter, since the very purpose of GB ‘202 is to overcome the problems associated with transporting slurries through pipelines having small diameters. In addition, the problems addressed in GB ‘202 are the exact opposite of those that occur with conduits having a larger diameter, as recited in claim 15. Thus, claim 15 is further distinguished from the disclosure of GB ‘202.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact MaryAnne Armstrong, Reg. No.

Application No. 10/550,545
Amendment dated February 16, 2010
After Final Office Action of October 16, 2009

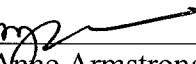
Docket No.: 0446-0180PUS1

40,069, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: **FEB 16 2010**

Respectfully submitted,

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